Programme Review Days 2015

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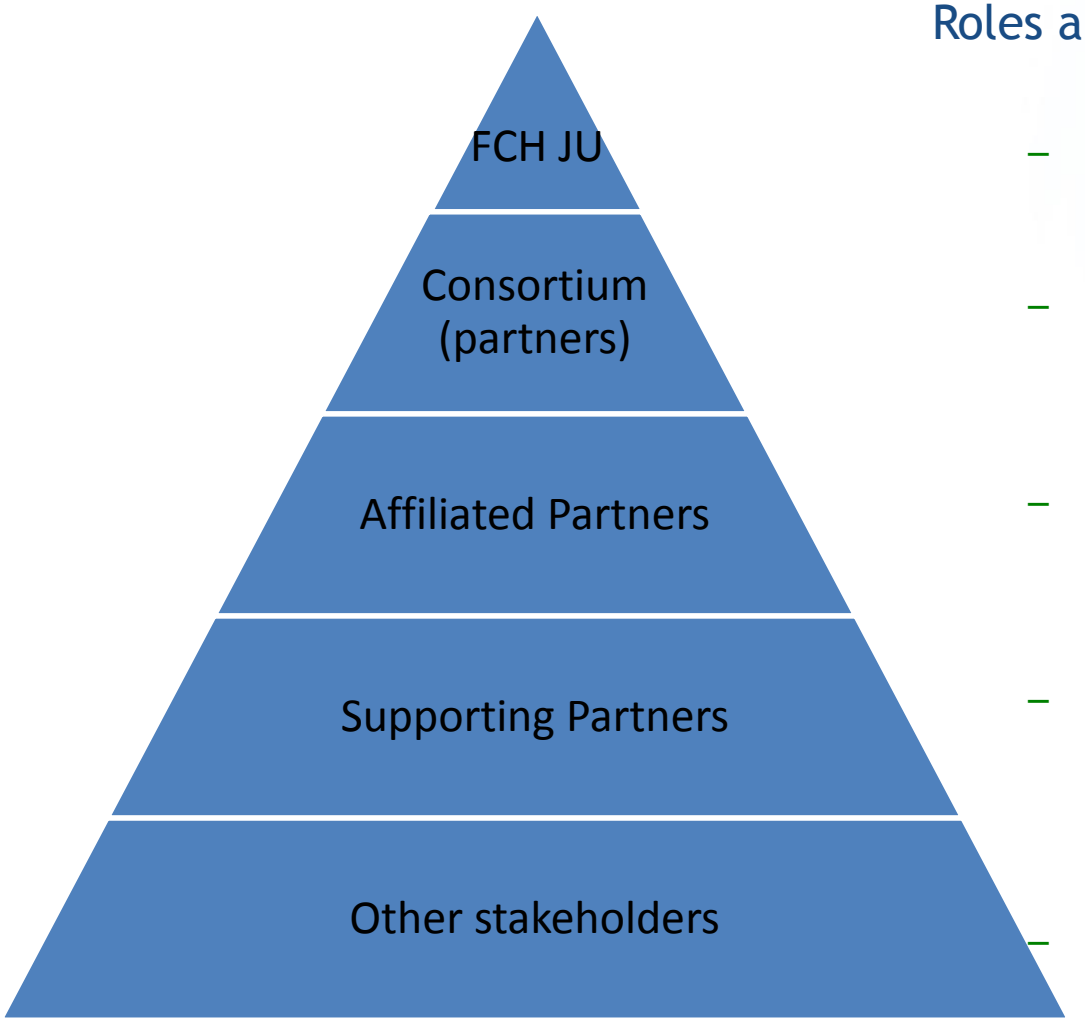
Background

- **Green Electricity: Lack of centralised coordination** leading to many schemes: RECS, Stromnachweis-Datenbank, Herkunftsnachweissystem, BlueRegistry, etc. -> need for a coordinated approach.
  - **Review all past and existing** initiatives to set up **GoOs systems** (green electricity, green gas and bio-fuels, etc).
  - **Consortium will not develop the definition of "green hydrogen",** but facilitate Industry, Policy Makers and the larger stakeholder community to come to an agreement.

- Call for proposals (SP1-JTI-FCH.2013.5.5):
  - Duration: 24 months (Nov 1st 2014 to October 30th 2016)
  - Budget contribution: 432K€

Actors involved in the project



Roles and responsibilities

- Public private partnership. Financial support and quality control (not on content)
- Formed by technology, policy and regulatory experts- Project organization and final decisions.
- Industry players (first circle of deep hydrogen knowledge). Dedicated input and feedback in close interaction with consortium.
- Companies, industry associations, NGOS and groups such as issuing, certification and standardization bodies. Active in open consultations and general feedback.
- Others, incl. policy makers (EC, Parliament and regional/national authorities). Spec. feedback at conferences and final stages.

Consortium

ECN: Energy Research Centre of the Netherlands, NL

Hinicio, Project coordinator, BE

LBST: Ludwig-Bölkow-Systemtechnik GmbH , DE

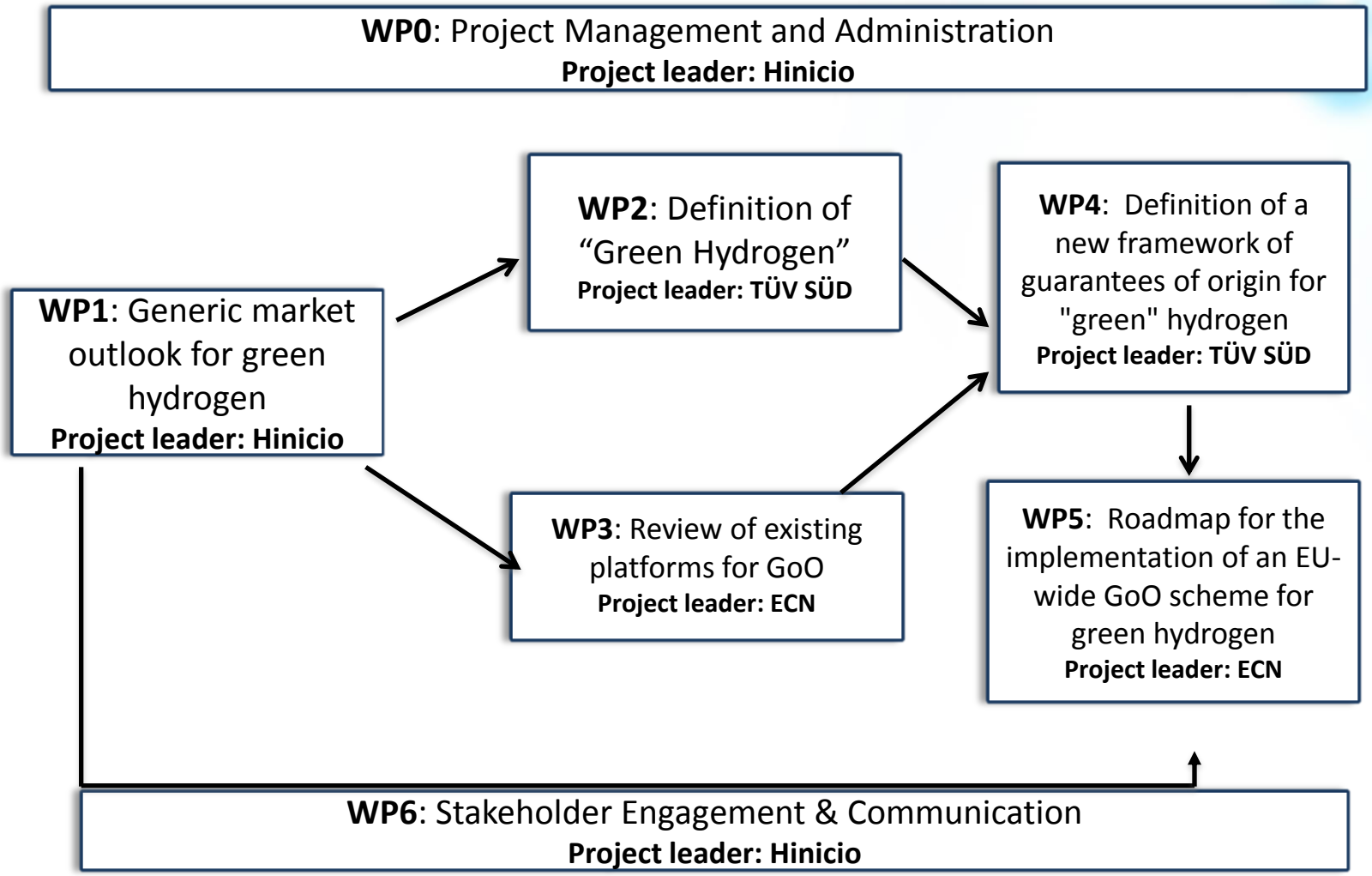
TÜV SÜD Industrie Service GmbH , DE

Affiliated Partners

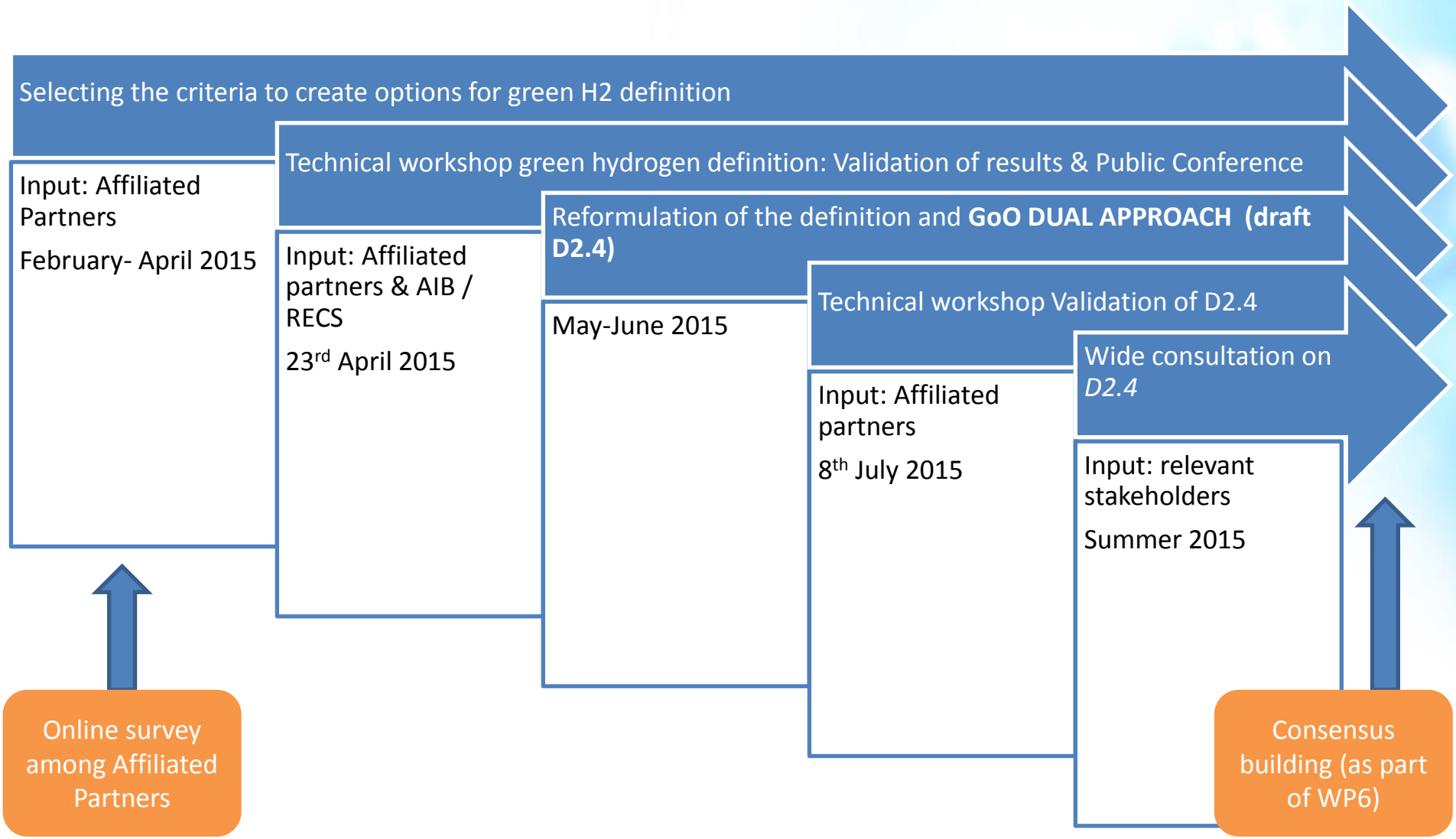
Good industry representation

- ✓ Gas suppliers,
- ✓ Electrolysers manufactures
- ✓ Energy utilities
- ✓ Oil and gas Companies
- ✓ Car manufacturers
- ✓ Retailers- Hydrogen users
- ✓ Chemical industry

Project structure and Workflow



Status WP2 / WP6 : Consultation on the definition of green hydrogen



Essential requirements

- The greenhouse gas (GHG) emissions intensity (based on a Life-Cycle Analysis (LCA) approach) of the hydrogen (H_2) produced by a facility, which participates to the Green hydrogen GoO scheme, even , must not be excessively high also for the hydrogen generated without a GoO.

- The scheme needs to support also the commercialisation of low-GHG emissions hydrogen, even when it is not of renewable origin ("dual purpose scheme").

- The approach needs to provide a way for defining the GHG content of hydrogen produced with generation of a GoO, but sold without it, and hence belonging to the "residual mix".

Adopted approach

- allow the generation of GoOs both for (i) CertifHy Green hydrogen (combining renewable origin with low GHG emissions) and for (ii) hydrogen that carries a low level of GHG emissions (applying the same low GHG emissions criteria as for CertifHy Green hydrogen), hereafter referred to as "CertifHy Low-GHG hydrogen"

- structurally ensure that the GHG emissions intensity of any non-certified hydrogen produced by a facility producing CertifHy Green hydrogen or CertifHy Low-GHG hydrogen does not exceed that of the benchmark process, i.e. steam methane reforming (SMR) of natural gas.

Conditions to be met by the GoO producting facilities

- The emissions associated to CertifHy Green H_2 and CertifHy Low-GHG H_2 must be lower than the Low Emissions Threshold, set at 36.4 gCO_{2eq}/MJ, i.e. benchmark value minus [60%] (*)

- H_2 produced by this facility that is neither CertifHy Green nor CertifHy Low-GHG (i.e. residual mix) must have emissions lower than the benchmark value.

(*) Reduction value to be confirmed at a later stage.

Definition of CertifHy Green / Low-GHG Hydrogen

CertifHy Green hydrogen is hydrogen from renewable sources that is also CertifHy Low-GHG-emissions hydrogen.

Hydrogen from renewable sources is hydrogen belonging to the share of production equal to the share of renewable energy sources (as defined in the EU RES directive) in energy consumption for hydrogen production, excluding ancillary functions.

CertifHy Low-GHG hydrogen is hydrogen with emissions lower than the defined CertifHy Low-GHG-emissions threshold, i.e. 36.4 gCO_{2eq}/MJ, produced in a plant where the average emissions intensity of the non-CertifHy Low-GHG hydrogen production (based on an LCA approach), since sign-up or in the past 12 months, does not exceed the emissions intensity of the benchmark process (SMR of natural gas), i.e. 91.0 gCO_{2eq}/MJ.

GoO Concept (to be further developped) 1 / 2

Data on Origin Production Batch	Units
• Date and time of hydrogen production (beginning and end)	
• Facility (identity, location, date of start of operation, process and capacity)	
• Energy sources (including GoO information if applicable)	
• Raw material sources (including sustainability information if applicable)	
• GHG emissions intensity of hydrogen produced	g $CO2_{eq}$ /MJ_{H2}
• Information on any support scheme (e.g. investment support, feed-in tariff, …)	

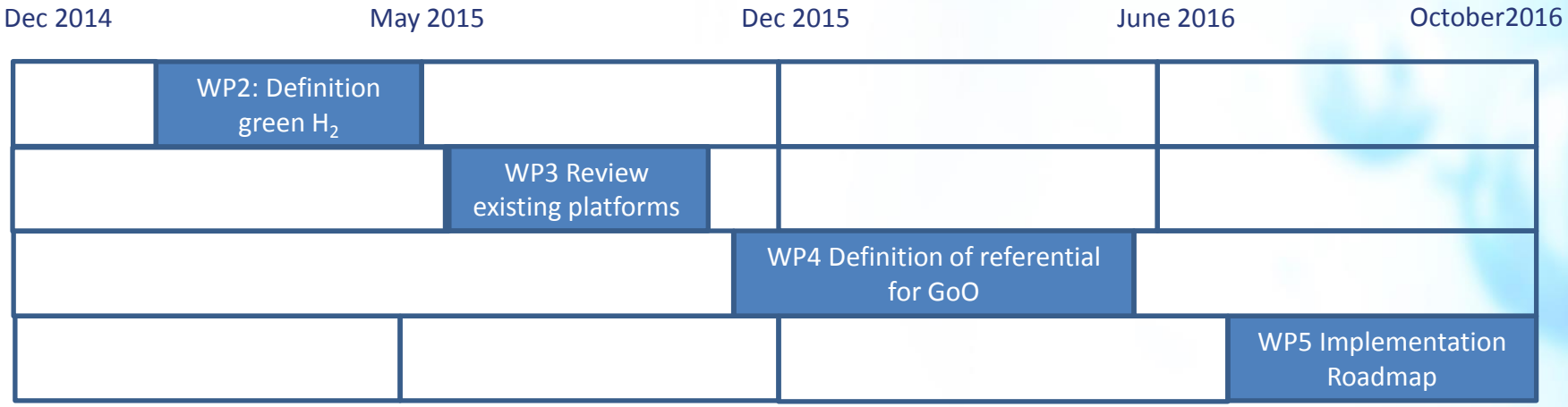
• For hydrogen produced as a by-product:
  ○ Main product
  ○ Basis of GHG emissions allocation (e.g. input energy share)	

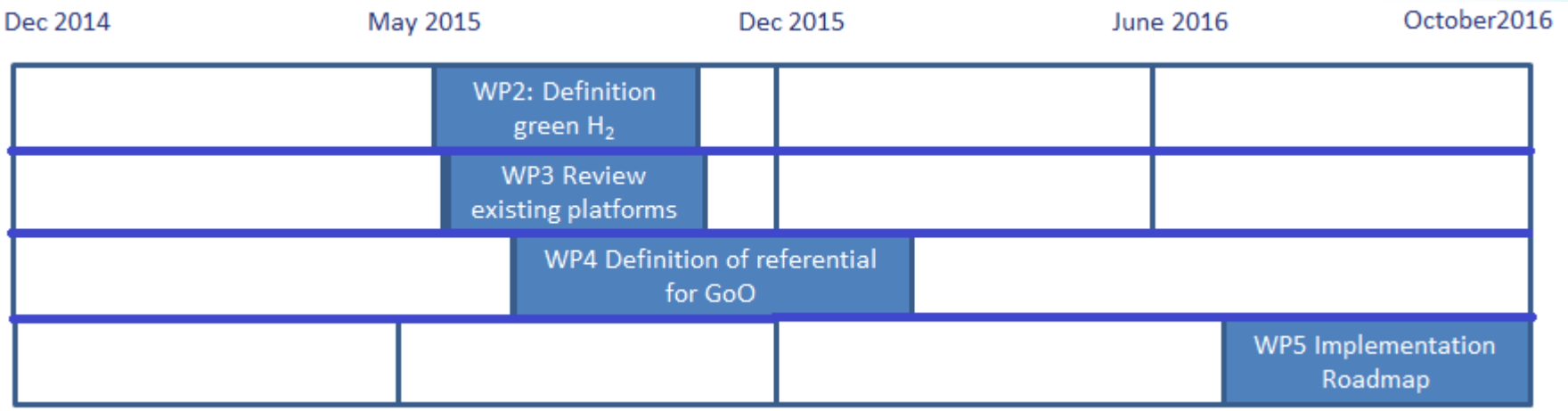
• Average GHG emissions intensity of all H_2 produced by the facility during the 12 months preceding date of production	g $CO2_{eq}$ /MJ_{H2}
• Share of renewable energy in total energy input* for producing the hydrogen	%
• Average GHG emissions intensity of the renewable share	g $CO2_{eq}$ /MJ_{H2}
• Average GHG emissions intensity of the non-renewable share	g $CO2_{eq}$ /MJ_{H2}
*excluding ancillary energy consumption	

GoO Concept (to be further developped) 2 / 2

Eligibility for *CertifHy Green Hydrogen* Guarantee of Origin	
CertifHy Green share of production [options]	%
Allocated GHG emissions intensity [options]	g $CO2_{eq}$ /MJ_{H2}
CHG emissions offsetting	Yes/No
Criteria:	
Does the unit quantity of hydrogen covered by this document belong to the CertifHy Green share of production?	Yes/No
Is the emissions intensity of the unit quantity of hydrogen covered by this document lower or equal to the CertifHy Low-GHG threshold (36,4 g$CO2_{eq}$)?	Yes/No
***CertifHy Green Hydrogen* Guarantee of Origin**	**Yes/No**
Eligibility for *CertifHy Low-GHG Hydrogen* Guarantee of Origin	
Allocated GHG emissions intensity	g $CO2_{eq}$ /MJ_{H2}
CHG emissions offsetting applied	Yes/No
Criterion: Is the emissions intensity of the unit quantity of hydrogen covered by this document lower or equal to the CertifHy Low-GHG threshold (36,4 g$CO2_{eq}$)?	Yes/No
***Low GHG Hydrogen* Guarantee of Origin**	**Yes/No**
Issuing Number : (At least one of the above criteria must be satisfied for a GoO to be issued)	

Original planning vs revised planning





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